

WHAT IS CLAIMED IS:

1. An allergen test chip, which comprises a solid substrate and at least one allergen fastened to said solid substrate, wherein said solid substrate comprises:
  - 5 (i) a substrate layer;
  - (ii) an adhesive intermediate layer located on said substrate layer; and
  - (iii) a surface layer located on said adhesive intermediate layer.
2. The allergen test chip as claimed in Claim 1, wherein said substrate layer comprises glass, a silicon chip, a ceramic material, a metal, a polyvinylidifluoride (PVDF) film or a cellulose acetate film.
- 10 3. The allergen test chip as claimed in Claim 1, wherein said adhesive intermediate layer comprises an epoxy resin.
4. The allergen test chip as claimed in Claim 1, wherein said surface layer comprises nitrocellulose or polystyrene.
- 15 5. The allergen test chip as claimed in Claim 1, wherein said allergen is an extract selected from a group consisting of dust mite, feather, pollen, fungi, bacteria, egg yolk, egg white, hogweed, milk, peanut, shrimp, crab, fish, clam, soybean, mango, cockroach, dog shedding, and cat shedding.
6. An allergen test chip, which comprises:
  - 20 (i) a solid substrate; and
  - (ii) at least one allergen fastened to said solid substrate.
7. The allergen test chip as claimed in Claim 6, wherein said solid substrate comprises a polymer synthesized from an organic molecule, wherein said organic molecule is selected from a group consisting of styrene, ethylene, propylene, ester, acrylic acid, acrylate, alkyl acrylic acid and alkyl acrylate.
- 25 8. The allergen test chip as claimed in Claim 6, wherein said allergen is an extract selected from a group consisting of dust mite, feather, pollen, fungi, bacteria, egg yolk, egg white, hogweed, milk, peanut, shrimp, crab, fish, clam, soybean, mango, cockroach, dog shedding, and cat shedding.
9. The allergen test chip as claimed in Claim 1 or Claim 6, wherein the allergen density on said allergen test chip is greater than 100 allergens/cm<sup>2</sup>.
- 30 10. A method for preparing an allergen test chip, which comprises
  - (a) coating an adhesive intermediate layer on a substrate layer;
  - (b) coating a surface layer on said adhesive intermediate layer; and
  - (c) fastening at least one allergen to said surface layer.
11. The method for preparing an allergen test chip as claimed in Claim 10, wherein said substrate layer comprises glass, a silicon chip, a ceramic material, a metal, a polyvinylidifluoride (PVDF) film or a cellulose acetate film.
- 35 12. The method for preparing an allergen test chip as claimed in Claim 10, wherein said adhesive intermediate layer comprises an epoxy resin.

13. The method for preparing an allergen test chip as claimed in Claim 10, wherein said surface layer comprises nitrocellulose or polystyrene.

14. The method for preparing an allergen test chip as claimed in Claim 10, wherein said allergen is an extract selected from a group consisting of dust mite, feather, pollen, fungi, bacteria, egg yolk, egg white, hogweed, milk, peanut, shrimp, crab, fish, clam, soybean, mango, cockroach, dog shedding, and cat shedding.

5 15. The method for preparing an allergen test chip as claimed in Claim 10, wherein said coating method comprises spin coating, dip coating, screen printing, roller coating, or curtain coating.

10 16. The method for preparing an allergen test chip as claimed in Claim 15, wherein said coating method is spin coating.

17. The method for preparing an allergen test chip as claimed in Claim 10, which, prior to coating said adhesive intermediate layer, further comprises a step of cleaning the surface of said substrate layer.

15 18. The method for preparing an allergen test chip as claimed in Claim 17, wherein said cleaning step is a pretreatment of cleaning with a solvent and/or an ultrasonic oscillation.

19. The method for preparing an allergen test chip as claimed in Claim 18, wherein said solvent is selected from the group consisting of surfactant, water, alcohol and acetone.

20. A method for preparing an allergen test chip, which comprises fastening at least one allergen to a solid substrate.

20 21. The method for preparing an allergen test chip as claimed in Claim 20, wherein said solid substrate comprises a polymer synthesized from an organic molecule, wherein said organic molecule is selected from a group consisting of styrene, ethylene, propylene, ester, acrylic acid, acrylate, alkyl acrylic acid and alkyl acrylate.

22. The method for preparing an allergen test chip as claimed in Claim 20, wherein said allergen is an extract selected from a group consisting of dust mite, feather, pollen, fungi, bacteria, egg yolk, egg white, hogweed, milk, peanut, shrimp, crab, fish, clam, soybean, mango, cockroach, dog shedding, and cat shedding.

25 23. A kit for testing an allergen, which comprises:

30 (i) an allergen test chip as claimed in any claim of Claim 1 to Claim 9;

(ii) an isolation solution for isolating a portion of said test chip not in combination with the allergen;

(iii) a secondary antibody which can specifically combine with an anti-allergic antibody;

(iv) a cleaning solution; and

(v) signal generation means for generating a signal by operatively in combination with said secondary antibody.

35 24. The kit as claimed in Claim 23, wherein said allergen is an extract selected from a group consisting of dust mite, feather, pollen, fungi, bacteria, egg yolk, egg white, hogweed, milk, peanut, shrimp, crab, fish, clam, soybean, mango, cockroach, dog shedding, and cat shedding.

25. The kit as claimed in Claim 23, wherein said secondary antibody comprises an anti-IgE antibody

or an anti-IgG antibody.

26. The kit as claimed in Claim 25, wherein said antibody comprises a monoclonal antibody or a polyclonal antibody.
27. The kit as claimed in Claim 23, wherein said cleaning solution comprises a phosphate buffer solution (PBS) or a tris hydroxymethyl amino methane buffer solution (TBS).
- 5 28. The kit as claimed in Claim 27, wherein said cleaning solution further comprises a surfactant.
29. The kit as claimed in Claim 23, wherein said signal generation means is selected from a group consisting of a radioactive marker, a fluorescent marker, a phosphorous marker, a luminescent marker, and an enzyme.
- 10 30. The kit as claimed in Claim 29, wherein said luminescent marker comprises a bioluminescent marker or a chemiluminescent marker.
31. The kit as claimed in Claim 29, wherein said enzyme is selected from a group consisting of an alkaline phosphorase (AP), a hydroperoxidase (HRP) and a  $\beta$ -galactosidase.
- 15 32. The kit as claimed in Claim 31, which further comprises a substrate, wherein said substrate can react with said enzyme and display a color.
33. The kit as claimed in Claim 29, wherein said signal generation means further comprises a biotin.
34. The kit as claimed in Claim 33, which further comprises an anti-biotin protein which can operatively combine with a radioactive marker, a fluorescent marker, a phosphorous marker, a luminescent marker, or an enzyme.
- 20 35. The kit as claimed in Claim 34, wherein said enzyme is selected from a group consisting of an alkaline phosphorase (AP), a hydroperoxidase (HRP) and a  $\beta$ -galactosidase.
36. The kit as claimed in Claim 35, which further comprises a substrate, wherein said substrate can react with said enzyme and display a color.
37. The kit as claimed in Claim 23, wherein said isolation solution comprises a solution of bovine
- 25 38. A method for testing an allergen, which comprises:
  - (a) providing an allergen test chip as claimed in Claim 1 to Claim 9;
  - (b) using an isolation solution to isolate a portion of said test chip not in combination with said allergen;
  - 30 (c) contacting the serum sample of a patient with said test chip;
  - (d) using a washing solution to perform a washing step;
  - (e) providing a signal generation means capable of generating a signal by operatively combining with a secondary antibody, wherein said secondary antibody can specifically combine with an anti-allergic antibody; and
  - 35 (f) measuring the signal generated by said signal generation means.
39. The method as claimed in Claim 38, wherein said allergen is an extract selected from a group consisting of dust mite, feather, pollen, fungi, bacteria, egg yolk, egg white, hogweed, milk, peanut, shrimp, crab, fish, clam, soybean, mango, cockroach, dog shedding, and cat shedding.

40. The method as claimed in Claim 38, wherein said secondary antibody comprises an anti-IgE antibody or an anti-IgG antibody.

41. The method as claimed in Claim 40, wherein said antibody comprises a monoclonal antibody or a polyclonal antibody.

5 42. The method as claimed in Claim 38, wherein Step (c) further comprises contacting a control standard antibody with said test chip.

43. The method as claimed in Claim 38, wherein said cleaning solution comprises a phosphate buffer solution (PBS) or a tris hydroxymethyl amino methane buffer solution (TBS).

44. The method as claimed in Claim 43, wherein said cleaning solution further comprises a surfactant.

10 45. The method as claimed in Claim 38, wherein said signal generation means is selected from a group consisting of a radioactive marker, a fluorescent marker, a phosphorous marker, a luminescent marker, and an enzyme.

46. The method as claimed in Claim 45, wherein said luminescent marker comprises a bioluminescent marker or a chemiluminescent marker.

15 47. The method as claimed in Claim 45, wherein said enzyme is selected from a group consisting of an alkaline phosphorase (AP), a hydroperoxidase (HRP) and a  $\beta$ -galactosidase.

48. The method as claimed in Claim 47, which further comprises adding a substrate, wherein said substrate can react with said enzyme and display a color.

20 49. The method as claimed in Claim 45, wherein said signal generation means further comprises a biotin.

50. The method as claimed in Claim 49, which further comprises adding an anti-biotin protein which can operatively combine with a radioactive marker, a fluorescent marker, a phosphorous marker, a luminescent marker, or an enzyme.

25 51. The method as claimed in Claim 50, wherein said enzyme is selected from a group consisting of an alkaline phosphorase (AP), a hydroperoxidase (HRP) and a  $\beta$ -galactosidase.

52. The method as claimed in Claim 51, which further comprises a substrate, wherein said substrate can react with said enzyme and display a color.

53. The method as claimed in Claim 38, wherein said isolation solution comprises a solution of

30 bovine serum albumin (BSA), casein or gelatin.